



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/992,578	11/06/2001	Ja-Young Koo	81758	9881
23685	7590	09/17/2004	EXAMINER	
KRIEGSMAN & KRIEGSMAN 665 FRANKLIN STREET FRAMINGHAM, MA 01702			MENON, KRISHNAN S	
			ART UNIT	PAPER NUMBER
			1723	

DATE MAILED: 09/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/992,578	Applicant(s) KOO ET AL.	
	Examiner Krishnan S Menon	Art Unit 1723	

S.C.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 September 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8, 10-17, 19, 20, 58-61 and 71-75 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8, 10-17, 19, 20, 58-61 and 71-75 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claims 1-8, 10-17, 19,20, 58-61 and 71-75 are pending.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 58-61 and 74-75 are rejected under 35 U.S.C. 102(b) as being anticipated by Marinaccio et al (US 4,915,839).

Claim 58: Marinaccio teaches a microporous membrane comprising a microporous support (abstract) and a hydrophilic coating directly on said microporous support made by applying and cross-linking a polyfunctional epoxy compound with three epoxy groups (see col 14 lines 34-49). Re self-polymerization, it is inherent even if the reference explicitly states so, since the reference uses the same reagents as claimed (see also applicants Specification page 12, last para). Under the principles of inherency, if a prior art device, in its normal and usual operation, would necessarily perform the method claimed, then the method claimed will be considered to be anticipated by the prior art device. When the prior art device is the same as a device described in the specification for carrying out the claimed method, it can be assumed the device will inherently perform the claimed process. In re King, 801 F.2d 1324, 231 USPQ 136 (Fed. Cir. 1986)

Claim 59: microporous membrane is a polyamide – see example 1.

Claim 60: microfiltration membrane – col 6 lines 54-56

Claim 61: microporous membrane is an ultrafiltration membrane – even though the reference focuses on microfiltration membrane in col 16 lines 36-57, the pore diameter for the microfiltration membrane overlaps with the pore diameter of the ultrafiltration membrane defined by the applicant in specification page 8 (upper limit of 500 nm = 0.5 microns; ref has microfiltration as from 0.05 microns or larger).

Claim 74 and 75: Marinaccio uses poly epoxies – there for has more than 4 epoxy groups and has polyglycerol polyglycidyl ether (col 14 – formula).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1-8, 10-17, 19, 20 and 71-73 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mickols (853) in view of Marinaccio et al (US 4,915,839).

Claims 1: Mickols teaches a reverse osmosis membrane comprising a microporous support, a polyamide layer on the microporous support (col 3 lines 10-20) and a hydrophilic coating of a cross-linked epoxy compound (col 4 lines 25-46) as in

claim 1. However, Mickols teaches a di-epoxide, not an epoxide having at least three epoxy groups. Marinaccio teaches three epoxy groups in cross-linking a membrane (see structures in col 12). It would be obvious to one of ordinary skill in the art at the time of invention to use the teaching of Marinaccio in the teaching of Mickols for having cationic, anionic or zwitterion membranes because it makes the membrane sanitizable or sterilizable, and capable of capturing anionic, cationic and other particles smaller than the effective pore size of the membrane (Marinaccio col 5 line 55 – col 6 line 11).

Also the structure of the hydrophilic coating taught by Mickols would be similar or obvious equivalent (structurally and functionally) to what is claimed, even if the Mickols ref does not teach self-polymerization for the coating or using cross-linking coatings that is different from the polyamide layer, unless the applicants can prove otherwise, with evidence. Self-polymerization or cross-linking are process steps. “[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.” *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

Cross-linking with the help of a cross-linking compounds – see Marinaccio col 9 line 61 – col 14 line 10); cross-linked through self polymerization: inherent from Mickols in view of Marinaccio; similar reagents as used by the applicant should produce similar products. The express, implicit, and inherent disclosures of a prior art reference may be

Art Unit: 1723

relied upon in the rejection of claims under 35 U.S.C. 102 or 103. "The inherent teaching of a prior art reference, a question of fact, arises both in the context of anticipation and obviousness." *In re Napier*, 55 F.3d 610, 613, 34 USPQ2d 1782, 1784 (Fed. Cir. 1995) (affirmed a 35 U.S.C. 103 rejection based in part on inherent disclosure in one of the references). See also *In re Grasselli*, 713 F.2d 731, 739, 218 USPQ 769, 775 (Fed. Cir. 1983).

Claims 2: microporous support is polysulfone, etc. (Mickols col 6 line 5)

Claim 3: polyamide layer by interfacial polymerization (Mickols col 3 lines 10-28)

Claims 4-6: polyfunctional amine is an aromatic primary amine, and metaphenylene diamine or piperazine (Mickols col 3 lines).

Claim 7, 8: polyfunctional acyl halide (Mickols col 3 lines 10-28); trimesoyl chloride (Mickols col 3 line 55)

Claim 10 and 73: one or more of the compounds listed are taught by Marinaccio (col 14 lines 1-68) – for example, polyglycerol polyglycidyl ether. Even if not, the number of compounds recited in the claims would make them obvious equivalents. These claims and Applicants' specification (pages 15-21) list a huge number of classes of compounds that would provide the hydrophilic coating, from which it seems that the compounds (species) are obvious equivalents [A prima facie case of obviousness may be made when chemical compounds have very close structural similarities and similar utilities. "An obviousness rejection based on similarity in chemical structure and function entails the motivation of one skilled in the art to make a claimed compound, in the expectation that compounds similar in structure will have similar properties." *In re*

Art Unit: 1723

Payne, 606 F.2d 303, 313, 203 USPQ 245, 254 (CCPA 1979). See *In re Papesch*, 315 F.2d 381, 137 USPQ 43 (CCPA 1963) (discussed in more detail below) and *In re Dillon*, 919 F.2d 688, 16 USPQ2d 1897 (Fed. Cir. 1991) (discussed below and in MPEP § 2144) for an extensive review of the case law pertaining to obviousness based on close structural similarity of chemical compounds. See also MPEP § 2144.08, paragraph II.A.4.(c).].

Self-polymerization is inherent with the triglycidyl ether in Marinaccio – *In re King*. Cross-linking with a cross-linking compound is taught by Marinaccio.

Claim 11: cross-linked through self polymerization: inherent from Mickols in view of Marinaccio; similar reagents as used by the applicant should produce similar products The express, implicit, and inherent disclosures of a prior art reference may be relied upon in the rejection of claims under 35 U.S.C. 102 or 103. “The inherent teaching of a prior art reference, a question of fact, arises both in the context of anticipation and obviousness.” *In re Napier*, 55 F.3d 610, 613, 34 USPQ2d 1782, 1784 (Fed. Cir. 1995) (affirmed a 35 U.S.C. 103 rejection based in part on inherent disclosure in one of the references). See also *In re Grasselli*, 713 F.2d 731, 739, 218 USPQ 769, 775 (Fed. Cir. 1983).

Claim 12: cross-linking with the help of a cross-linking compound – see col 9 line 61 – col 14 line 10)

Claim 13: epoxy reactive groups amino or carbonyl – col 12 line 32- col 13 line66 (see also claim 10 rejection)

Claim 14: at least two epoxy reactive groups are the same – amines, for example – col 13 line 56-62

Claim 15: epoxy reactive groups can be different: amine or hydroxyl groups Marinaccio (col 13 lines 63-67).

Claim 16: cross linking agent selected from diols such as 1,3-propane diol, etc – see Marinaccio col 14 lines 24-28.

Claim 17: Marinaccio teaches a variety of primary and secondary amines as the cross-linking compounds. Even though Applicants have deleted by this amendment the species of amines and the amines represented by the general formula listed in the reference, the claim still is not patentable because the species listed in the claim are considered obvious equivalents to what the reference teaches, unless the applicants can provide evidence to prove otherwise. This claim and Applicants' specification (pages 15-21) list a huge number of classes of compounds that would provide the hydrophilic coating, from which it seems that the compounds are obvious equivalents [In re Payne In re Payne, 606 F.2d 303, 313, 203 USPQ 245, 254 (CCPA 1979)].

Claims 19 and 20: Marinaccio may not be listing the exact carboxylic or sulfonic acids listed as in these claims, but teaches polyfunctional carboxylic or sulfonic acids in col 13 line 55 – col 14 line 11, which would afford anionic (negative charged) membrane, or compounds having zwitter ions in col 14 lines 55-68, as recited in the specification page 19, 4th para 4 and page 20, 1st para, and therefore, equivalent. In this case, the prior art element: (A) performs the identical function specified in the claim in substantially the same way, and produces substantially the same results as the

Art Unit: 1723

corresponding element disclosed in the specification. *Kemco Sales, Inc. v. Control Papers Co.*, 208 F.3d 1352, 54 USPQ2d 1308 (Fed. Cir. 2000). (B) is not excluded by any explicit definition provided in the specification for an equivalent. A person of ordinary skill in the art would have recognized the interchangeability of the element shown in the prior art for the corresponding element disclosed in the specification. *Caterpillar Inc. v. Deere & Co.*, 224 F.3d 1374, 56 USPQ2d 1305 (Fed. Cir. 2000); *Al-Site Corp. v. VSI Int'l, Inc.*, 174 F.3d 1308, 1316, 50 USPQ2d 1161, 1165 (Fed. Cir. 1999); *Chiuminatta Concrete Concepts, Inc. v. Cardinal Indus. Inc.*, 145 F.3d 1303, 1309, 46 USPQ2d 1752, 1757 (Fed. Cir. 1998); *Lockheed Aircraft Corp. v. United States*, 193 USPQ 449, 461 (Ct. Cl. 1977); *Data Line Corp. v. Micro Technologies, Inc.*, 813 F.2d 1196, 1 USPQ2d 2052 (Fed. Cir. 1987). Also, a prima facie case of obviousness may be made when chemical compounds have very close structural similarities and similar utilities. "An obviousness rejection based on similarity in chemical structure and function entails the motivation of one skilled in the art to make a claimed compound, in the expectation that compounds similar in structure will have similar properties." *In re Payne*, 606 F.2d 303, 313, 203 USPQ 245, 254 (CCPA 1979). See *In re Papesch*, 315 F.2d 381, 137 USPQ 43 (CCPA 1963) and *In re Dillon*, 919 F.2d 688, 16 USPQ2d 1897 (Fed. Cir. 1991) (discussed in MPEP § 2144) for an extensive review of the case law pertaining to obviousness based on close structural similarity of chemical compounds. See also MPEP § 2144.08, paragraph II.A.4.(c). "[I]n considering the disclosure of a reference, it is proper to take into account not only specific teachings of the reference but also the inferences which one skilled in the art

Art Unit: 1723

would reasonably be expected to draw therefrom.” In re Preda, 401 F.2d 825, 826, 159 USPQ 342, 344 (CCPA 1968); In re Lamberti, 545 F.2d 747, 750, 192 USPQ 278, 280 (CCPA 1976).

Claims 71, 72: four epoxy groups: Marinaccio uses poly epoxies – there for has more than 4 epoxy groups (col 14 – formula). The compounds listed in claim 72 and 75 could be represented by the formulae in col 12, or are their equivalent, unless the applicant can show substantial and non-obvious difference in the resulting membrane products.

In all the above claims, as in claim 1, it would be obvious to one of ordinary skill in the art at the time of invention to use the teaching of Marinaccio in the teaching of Mickols for having cationic, anionic or zwitterion membranes because it makes the membrane sanitizable or sterilizable, and capable of capturing anionic, cationic and other particles smaller than the effective pore size of the membrane (Marinaccio col 5 line 55 – col 6 line 11).

Response to Arguments

Applicant's arguments filed 9/7/04 and 6/28/04 have been fully considered.

Arguments filed 9/7/04 re the Mickols ref: applicants arguments re claim 1 that this reference does not teach ‘self polymerization and/or by using a cross-linking compound that is not the polyamide layer’ is moot. The rejection is not on Mickols ref alone, but is in combination with Marinaccio. In addition, claim 1 has no limitations that would structurally differentiate the product as claimed, i.e., made by ... cross-linking

Art Unit: 1723

compounds that is not a polyamide layer or by self-polymerization, from the teachings of the references. Applicants need to show with evidence that the resulting structure of the membrane in claim 1 is different from that of the teachings of the references. 'Self-polymerization' or 'cross-linking without using the polyamide layer' are only process steps. The references does teach cross-linking with cross-linking agents other than the polyamide layer as shown in the rejection. Therefore, these arguments are not persuasive.

Arguments filed 6/28/04: On page 16, applicants argue that the patent office is apparently operating under the assumption that the Marinaccio compounds may be regarded as interchangeable with Mickols compounds [for the purpose of obviousness]. In response, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). The argument that Marinaccio uses the compounds in an entirely different manner, they have different purpose, etc have already been addressed in the previous (final) action.

Arguments re the Linder ref are moot – new grounds for rejection.

Conclusion

This action is in response to an RCE, and is made non-final because of the new grounds for rejection for some of the claims.

Art Unit: 1723

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Krishnan S Menon whose telephone number is 571-272-1143. The examiner can normally be reached on 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wanda L Walker can be reached on 571-272-1151. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Krishnan Menon
Patent Examiner


W. L. WALKER
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700